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(cont)

collectors and the magnetic field so that magnetic field lines are directed substantially parallel to a direction of current flow in a region where the plurality of current collectors contact the armature conductor turns to reduce induced magnetic forces on the current collectors.

In the Claims:

Please SUBSTITUTE the following amended claims for the like numbered pending claim:

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1. (Amended) A homopolar machine comprising:  
a shaft;  
an armature assembly, coupled to the shaft, that includes a plurality of armature conductor turns;  
an outer flux return that encloses the armature assembly;  
a plurality of stator-current collector arrays, coupled to the outer flux return, that encircle the armature assembly, each stator-current collector array including a plurality of current collectors that provide a sliding electrical current interface with the armature conductor turns; and  
means for maintaining substantially constant contact pressure of the current collectors with the armature conductor turns in the presence of high magnetic fields produced by superconducting field coils.

2. (Amended) A homopolar machine comprising:  
a shaft;  
an armature assembly, coupled to the shaft, that includes a plurality of armature conductor turns;  
an outer flux return that encloses the armature assembly; and

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(cont)

a plurality of stator-current collector arrays, coupled to the outer flux return, that encircle the armature assembly, each stator-current collector array including a plurality of current collectors that maintain substantially constant contact pressure with the armature conductor turns in the presence of high magnetic fields to provide a sliding electrical current interface with the armature conductor turns;

wherein the outer flux return comprises a geometry that directs magnetic field lines substantially parallel to a direction of current flow in a region where the plurality of current collectors contact the armature conductor turns to reduce induced magnetic forces that may deflect the current collectors.

3. (Amended) A homopolar machine in accordance with claim 1, wherein each of the current collectors comprises a solid material.

4. (Amended) A homopolar machine in accordance with claim 1, wherein each of the current collectors comprises a flexible, electrically conductive material.

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Please ADD the following NEW claims:

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9. (New) A method of operating a homopolar machine, comprising the steps of:

rotating an armature assembly that includes a plurality of armature conductor turns;

creating a magnetic field through the armature assembly;

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providing a plurality of stator-current collector arrays that encircle the armature assembly, each stator-current collector array including a plurality of current collectors which provide a sliding electrical current interface with the armature conductor turns;

reducing induced magnetic forces that may deflect the current collectors by directing magnetic field lines substantially parallel to a direction of current flow in a region where the plurality of current collectors contact the armature conductor turns; and

maintaining substantially constant contact pressure between the plurality of current collectors and the armature assembly in the presence of the magnetic field.

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Cost  
10. (New) A method in accordance with claim 9, wherein the step of creating a magnetic field through the armature assembly comprises the step of creating a magnetic field through the armature assembly with superconducting field coils.

11. (New) A method in accordance with claim 9, wherein each of the current collectors comprises a solid material.

12. (New) A method in accordance with claim 9, wherein each of the current collectors comprises a flexible, electrically conductive material.

13. (New) A method in accordance with claim 9, wherein each of the current collectors comprises electrically conductive fibers made from copper.

14. (New) A method in accordance with claim 9, wherein each of the current collectors comprises electrically conductive fibers made from copper alloys.

15. (New) A method in accordance with claim 9, wherein each of the current collectors comprises electrically conductive foils made from copper.

16. (New) A method in accordance with claim 9, wherein each of the current collectors comprises electrically conductive foils made from copper alloys.

17. (New) A method of operating a homopolar machine, comprising the steps of:

energizing superconducting field coils in the homopolar machine to create a magnetic field through an armature assembly that includes a plurality of armature conductor turns;

supplying current to a plurality of current collectors that provide a sliding electrical current interface with the armature conductor turns; and

maintaining an orientation of the plurality of current collectors and the magnetic field so that magnetic field lines are directed substantially parallel to a direction of current flow in a region where the plurality of current collectors contact the armature conductor turns to reduce induced magnetic forces on the current collectors.

18. (New) A method in accordance with claim 17, wherein each of the current collectors comprises a solid material.

19. (New) A method in accordance with claim 17, wherein each of the current collectors comprises a flexible, electrically conductive material.